NOTES.

THERE is a sign that some interest is being shown by Court officials in scientific matters, for the Court Circular announced on January 20 that an "Empire clock" had been brought under the notice of the King and its mechanism explained. The invention which has been afforded this honour is a terrestrial globe kept in rotation by clockwork. A fixed ring parallel to the equator has time divisions marked upon it, and as the globe rotates the position of any meridian with reference to this ring enables the time to be seen. Judging from the prominence given to this clock, it would seem that the King's household and writers in the daily Press marvel that it should be possible to show the effects of the diurnal motion of the earth by means of a model driven by clockwork, or to represent the change of declination of the sun by a gilded ball sliding on a wire. To anyone familiar with astronomical models the device would scarcely appear worthy of being brought under the King's attention. Perhaps we shall next see the announcement by the Court newsman that someone has had the honour of demonstrating a method of proving the principle of Archimedes. A beginning having been made, we may look forward to the time when apparatus really of scientific importance will be regarded with the interest given to a clockwork globe.

A STRIKING instance of the assistance which can be rendered by wireless telegraphy in overcoming the difficulties and dangers of navigation was afforded in the case of the collision of the steamship *Florida* with the White Star liner *Republic* in the early morning of January 23. The collision occurred in a dense fog at 5.30 a.m., 175 miles east of the Ambrose lightship, New York. The *Republic* is equipped with a wireless telegraphy installation, and the captain, who was on the bridge at the time of the accident, at once had wireless messages for help sent out. The operator was Mr. J. Binns, and he remained at his post until help was received. The messages were received by the liners *Baltic*, the *Lorraine*, and the *Lucania*, the nearest of these being some 100 miles away. The steamships proceeding to the rescue were able to transmit a wireless message to the *Republic* asking for the latitude and longitude of the collision, which was answered from the *Republic* as being 40° 17′ N. and 76° 26′ W. Wireless telegraphy has thus been the means of averting a terrible calamity. It also enabled the responsible authorities at New York to get into communication with the ships, to learn promptly the exact state of things, and to issue any necessary instructions.

THE inoculation of soils intended to carry leguminous crops with the appropriate organism for fixing nitrogen has recently been the subject of several letters in the *Times*. It was pointed out in these columns a year ago (February 6, 1908, vol. lxxvii, p. 330) that the experiments quoted in favour of these particular cultures really prove nothing. Since then extensive trials have been made at the Royal Horticultural Society's Gardens, Wisley, and gave entirely negative results. We know of no properly conducted experiments with these cultures that have given definite positive results; the evidence adduced in Messrs. Carter's letter is of the same kind as that given in the original pamphlet, and cannot be regarded as throwing fresh light on the subject. It is distinctly unfortunate for soil bacteriology that a process should be recommended for adoption on the practical scale when it is as yet only in the laboratory stages.

THE seventeenth Deutscher Geographentag will meet at Whitsuntide (June 1–3) in Lübeck. Communications intended for the meeting should be sent before March 1 to the secretary of the association, Königstrasse 5, Lübeck.

UPON the recommendation of a joint committee of the Royal Society of Arts and the Royal College of Physicians, the Swiney prize has been awarded to Dr. C. A. Mercier, for his work on "Criminal Responsibility." The prize is a cup of the value of 100*l.* and money to the same amount.

THE death is reported of Dr. C. Denison, of Denver, Colorado, a specialist in the problems of tuberculosis, particularly in their relation to climatic conditions. He was professor emeritus of diseases of the chest in the University of Denver. In 1890 he was president of the American Climatological Association.

IT is reported that Monte Cagua, a volcano situated in the Tayabas province, in the south-western part of the island of Luzon, Philippines, became suddenly active on January 19, breaking out into a violent eruption and doing serious damage to the surrounding country. During the eruption streams of lava are stated to have rushed down the sides of the volcano.

A GERMAN mineralogical association has been inaugurated, says the *Revue scientifique*. Prof. Max Bauer, of Marburg University, has been elected president, and Prof. F. Berwerth, of the University of Vienna, and Prof. R. Brauns, of the University of Bonn, vice-presidents. It is said that the first general meeting of the association will be held at Salzburg on September 18 next.

WE learn from the *Lancet* that the efforts of the Grecian League against malaria have had wonderful results in the plain of Marathon, which used to be a hotbed of fever. In 1906, 90 per cent. of the cases of sickness were due to malaria. In 1907, after the first efforts of the league, the malaria cases fell to 47 per cent. of all cases of sickness. During last summer, however, usually the most intensely malarious season, the sickness due to malaria fell to only 2 per cent. of the total amount of sickness at Marathon.

ON Tuesday next, February 2, Prof. A. A. Macdonell will begin a course of three lectures at the Royal Institution on "The Architectural and Sculptural Antiquities of India." During the course the Buddhist, Hindu, and Mohammedan antiquities will be dealt with, and illustrated with lantern-slides. The Friday evening discourse on February 5 will be delivered by Prof. J. G. Frazer, on "The Influence of Superstition on the Growth of Institutions," and on February 12 by Prof. H. A. Wilson, on "The Electrical Properties of Flame." The discourse on February 26 will be delivered by Prof. H. L. Callendar, on "Osmotic Phenomena," instead of by the Earl of Berkeley.

AT the annual meeting of the Entomological Society held on January 20 the following officers and council were elected for the session 1909–10:—*President,* Dr. F. A. Dixey; *treasurer,* Mr. A. H. Jones; *librarian,* Mr. G. C. Champion; *secretaries,* Mr. H. Rowland-Brown and Commander J. J. Walker, R.N.; *other members of the council,* Dr. T. A. Chapman, Mr. A. Harrison, Mr. Selwyn Image, Dr. K. Jordan, Dr. G. B. Longstaff, Mr. H. Main, Mr. G. A. K. Marshall, Prof. E. B. Poulton, F.R.S., Mr. R. Shelford, Mr. Rowland E. Turner, Mr. J. W. Tutt, and Mr. C. O. Waterhouse.

A REUTER message from Stockholm states that on January 22 Dr. Sven Hedin delivered a lecture upon his travels in Central Asia before a large audience, which included King Gustav and the Royal Family, and the members of the Anthropological and Geographical Societies. The Wahlburg medal of the latter society has been conferred on Dr. Sven Hedin, and the society has raised a fund of 10,000 kroner (about 555*l.*), to be known by the explorer's name, which will be devoted to purposes of geographical research.

THE following are the names of officers and council elected at the annual meeting of the Royal Meteorological Society on January 20:—*President*, Dr. H. Mellish; *Vice-Presidents,* Mr. W. W. Bryant, Mr. W. H. Dines, F.R.S., Commander M. W. C. Hepworth, C.B., Dr. H. R. Mill; *Treasurer*, Dr. C. T. Williams; *Secretaries*, Mr. F. C. Bayard, Commander W. F. Caborne, C.B.; *Foreign Secretary*, Dr. R. H. Scott, F.R.S.; *Council*, Messrs. R. Bentley, F. J. Brodie, C. J. P. Cave, Dr. H. N. Dickson, F. Druce, E. Gold, R. Inwards, B. Latham, R. G. K. Lempfert, Colonel H. E. Rawson, C.B., Captain R. C. Warden, Captain D. Wilson-Barker.

AN Imperial International Exhibition is to be held this year on the site occupied by the Franco-British Exhibition of 1908. The exhibition will be opened early in May, and close in October. We notice that the general committee includes a generous proportion of well-known men of science, and that prominence is to be given in the exhibition to science and technology. Among the groups of exhibits to be arranged will be collections representing education, mechanical and civil engineering, agriculture, mines and metallurgy, and chemical and electrical industries. Judging from the detailed subheadings under which the exhibits are to be arranged, the exhibition, as a whole, will serve to illustrate recent progress of applied science in various countries.

THE International Waterways Treaty, which was under discussion in the United States Senate last week, is the outcome of the International Waterways Commission, consisting of three representatives from the United States and three from Canada, which was appointed four years ago. Among the objects which the treaty has in view is the preservation of the levels of all the international waters in the North American continent—a matter of vast importance to the peoples of both countries, and, in the case of the river Niagara, to the whole world. According to the Ottawa correspondent of the *Times,* the two countries are entitled to the water in equal proportion, but if the United States were to take a quantity similar to that taken by Canada, unquestionably the beauty of the American falls would be spoiled and, perhaps, entirely destroyed. One mile above the Niagara Falls the water flows evenly between the two countries, but as it approaches the crest of the falls the current swings over towards the Canadian side. The Waterways Commission recommended that the limit of Canada's rights should not exceed 36,000 feet per second, and, in order to preserve the American falls, a limit was suggested of 18,500 cubic feet per second for the United States. The latter provision has been increased by the new treaty to 20,000 feet, as experiments made last summer demonstrated that the effect of the diversion of water on the American falls was less than had been anticipated. Canada receives 16,000 feet more than her neighbour, and this will enable the three companies on the Ontario side to develop 425,000 horse-power, as against 236,000 on the New York side. By the new treaty neither country can take any action which will lower the levels of the waters of the Great Lakes without the consent of the commission. In the opinion of competent authorities, the diversion of 20,000 feet per second for the Chicago Drainage Canal, which has been proposed, will affect the levels of Lake Michigan, Lake Huron, Lake Erie, Lake Ontario, and the St. Lawrence River seriously. It is not likely that the commission will authorise the diversion of so large a quantity of water.

A MOVEMENT has been set on foot by the English Ceramic Society for a conference of representatives of the various technical institutes and societies to consider ways and means of arranging for the "grading" and standardising, so far as possible, of the refractory materials, such as fireclay, magnesite, &c., used in the construction of furnaces, kilns, ovens, &c. Representatives of various institutes of societies met at Stoke-on-Trent on January 4 and formed themselves into a committee for the standardisation of refractory materials. The general opinion of the representatives present was that there is need for such a committee, and that the following preliminary scheme should be adopted:—(*a*) to arrange and classify the various refractory materials—clay; siliceous, as silica and gannister; special, as magnesite, chromite, &c.; (*b*) to arrange standard specifications for the raw materials and for the manufactured products; (*c*) to consider the possibility of arranging for uniformity in certain "stock" or "standard" sizes; (*d*) standard methods of testing, analysis, &c. To carry out this scheme, it was agreed that the representatives of the institutes should consult with their respective fellow members, and wherever possible procure information bearing on their specific requirements, together with data as to furnace temperatures and conditions of operation. There is no doubt that the work undertaken by the committee is important. The methods in vogue for the investigation of clays have so advanced in recent years that this subject can now be treated in a manner which would have been impossible five or six years ago. It is to be hoped that all consumers of refractory materials will communicate their views on the matter either to the secretaries of the different institutes and societies or direct to the general secretary, Dr. J. W. Mellor, English Ceramic Society, Stoke-on-Trent.

THE life and works of Thomas Pennant (1726–98) form the subject of this month's contribution to the biographies of early British ornithologists in Witherby's *British Birds.* Few persons other than professed naturalists are probably aware of the number of works which flowed from the pen of this voluminous writer, not many of which are, however, now consulted. The memoir is illustrated by a reproduction of the portrait by Gainsborough.

THE retirement of Mr. Montagu Browne from the post of curator has furnished the authorities of the Leicester Museum and Art Gallery with a favourable opportunity of reviewing, and when necessary modifying, the arrangement and scope of the natural history exhibits. According to the sixteenth report, dealing with the period from April 1, 1905, to March 31, 1908, it has been decided to display collections forming a complete record of the natural history, geology, and antiquarian ethnography of the district. In addition to this, as may be justifiable in a city so large as and so distant from the metropolis as Leicester, general collections in certain groups are to be exhibited. In future the reports will be issued and published annually.

Two papers on the mammalian brain appear in the January number of the *Journal of Anatomy and Physiology*. In the first of these Prof. Peter Thompson gives a description of a model of the brain of a fœtal cat 20 millimetres in length, while in the second Dr. E. H. J. Schuster continues his elaborate and richly illustrated account of three Chinese brains in the museum of the Royal College of Surgeons. Special interest attaches to the model of the kitten's brain on account of the fact that very few such models illustrating the early stages of mammalian cerebral development have hitherto been prepared. It is noteworthy that this brain presents a striking resemblance to that of the human fœtus at the third month.

WE are indebted to Prof. T. D. A. Cockerell for certain desirable corrections in a note published in NATURE for November 12, 1908, on his article in the *American Naturalist* for September of the same year on the Miocene fresh-water beds of Florissant, Colorado. He points out that it is the genus Trichophanes, and not the Florissant representative thereof, that was first described from Nevada. Also, it is the existing genus Percopsis, and not Trichophanes (which is solely Miocene), that lived in open glacial water during the Florissant period. In place of expressing a definite opinion on the bearing of the Florissant fauna and flora on the problem of a former connection between the southern continents, the author leaves the question open. We may take this opportunity of mentioning that a case containing a representative series of the Florissant fossils was recently placed on exhibition in the reptile gallery of the geological department of the Natural History Museum.

AN illustrated paper, read at the Ipswich Conference of 1908, on the history of the museum at Ipswich, by the curator of that institution, forms the opening article of the *Museums Journal* for December last. This is one of the few local museums established in the eighteenth century, dating from 1791, when the Rev. William Kirby, the well-known entomologist, was granted the use of a room in the Town Hall as a museum. From this humble beginning the present institution, with its invaluable collection of Crag vertebrates, has been gradually evolved. A great impetus was given in 1846 by a member of the local firm of Ransomes and Sims, when a special building was erected; another advance was made in 1868, when the erection was enlarged, while in 1881 the present handsome building was opened to the public. It is mainly to the energy of the late Prof. Henslow that Ipswich owes its collection of phosphatic nodules containing vertebrate remains from the Crag.

AT the Physiological Laboratory, London University, South Kensington, the opening lecture of the year was delivered by the director, Dr. A. D. Waller, F.R.S., on January 10, the Vice-Chancellor, Sir William J. Collins presiding. Dr. Waller took as his subject the positive and negative phenomena attendant upon the activity of living matter, as illustrated by the electrical phenomena aroused in the retina by light. He showed experiments demonstrating the double effect of light upon the retina, and demonstrated similar currents in response to electrical stimuli. Experiments on nerve were shown in illustration of the same principle, and the effect of anæsthetics at definite percentage was demonstrated with the aid of Dr. Waller's chloroform balance. The effect upon muscle of anæsthetics in solution was demonstrated as a lantern experiment, the physiological equivalence brought out by this method being that one molecule of chloroform is physiologically equivalent to ten molecules of ether and to 100 molecules of alcohol. This method is also convenient for the physiological standardisation of drugs. The Vice-Chancellor, Sir William J. Collins, spoke of the laboratory as fulfilling in one subject, physiology, the general aim of the University, since its re-constitution, to become a seat of learning, to bring to a focus at the headquarters of the University the knowledge and talents of the distinguished men in the many colleges of the metropolis, and congratulated Dr. Waller on the success that had attended his efforts during the last seven years. The Vice-Chancellor referred to the liberal donors who had supported the work financially, Sir Walter Palmer and Mr. George and Mr. Alfred Palmer at the University, South Kensington, and Dr. Ludwig Mond and Dr. Plimmer at the University, University College.

IN connection with the proposed utilisation of the river Tuolumne, flowing through part of the famous Yosemite National Park, California, as the source of a water-supply for San Francisco, Mr. J. Muir contributes a short article to the *Century Magazine* (January) on this valley, the Hetchy-Hetchy. It is not difficult to understand that this is the home of magnificent specimens of California live-oak and white pine, below which the ground is tufted "with ceanothus and manzanita bushes, azalea and brier-rose." Fortunately, the conversion of a valley into a water-reservoir does not necessitate the annihilation of natural scenery, and this article will serve its purpose if such a disaster is averted.

AN investigation of the nuclear changes during the first division in the pollen mother-cell of species of Œnothera, undertaken by Mr. R. R. Gates to look for an explanation of the hybrid and mutant formation in the genus, is described in the *Botanical Gazette* (July, 1908). The early stages of the first heterotypic division appear to favour the end-to-end rather than the lateral union of homologous chromosomes. It was observed that frequently pairing of the chromosomes on the nuclear spindle fails to take place, with the result that two chromosomes of a pair proceed to the same instead of to opposite poles, and so enter the same daughter nucleus. If the chromosomes are transmitters of definite characters, one nucleus would then be lacking in a certain character, and thus a hypothesis may be deduced for explaining the peculiarities noted.

THE recently published number of the Transactions of the Royal Scottish Arboricultural Society (vol. xxii., part i.) contains the report of a lecture by Sir Herbert Maxwell on the need for scientific management and extension of the forests in the United Kingdom. He points out that the proportion of woodland to the total area is about 4 per cent., less than in any other European country, and that the existing woods are a source of great expense instead of producing revenue. It is instructive to contrast with this an article on the Zürich woods by Mr. F. Story. These date back to the fourteenth century, and yield a good annual profit. Beech forms the bulk of the hardwood forest; sycamore and ash come next in importance, while oak is practically disregarded; spruce is the most valued conifer. Within modern times a saw-mill and turnery, also apparatus for drying and impregnating timber, have been introduced.

IN a memorandum on the meteorology of India during October and November, 1908, Dr. G. T. Walker, director-general of observatories, discusses in detail the conditions likely to affect the precipitation of January and February. From present data and from experience gained from the indications of previous years, the inference drawn is that it is "probable that the amount of rainfall in northern India and of snowfall on the neighbouring mountain areas will, at any rate during the earlier part of the season, approximate closely to the average."

In the *U.S. Monthly Weather Review* for September last Prof. C. F. Marvin describes a new form of compensated siphon barograph, consisting of three separate parts, which he has invented and has found to give very satisfactory results. The long and short branches of the siphon are simple, straight tubes fitted into the upturned branches of the bend, or U. This three-piece construction enables the barometer to be filled very easily, and, when once filled, it can be dismantled and transported without loss of the vacuum. In the barograph illustrated in the paper the changes are magnified five times by means of a large and small wheel operating on the principle of the wheel and axle, with a pen marking upon a drum driven by clockwork in the usual way. The drum revolves once in three days and two hours, moving at the rate of about a quarter of an inch per hour. The instrument is provided with a time-marking device consisting of an electromagnet, which operates once each hour. A small section of an actual record is reproduced in the paper, and shows that the pen responds to minute changes of level of the mercury. Prof. Marvin concludes by giving useful illustrations of the various methods adopted in filling barometer tubes.

The British Fire Prevention Committee has just published two pamphlets giving particulars of experimental tests which have been carried out by it of the merits of asbestos cloths, sand, steam, hand-pumps, buckets of water, and other appliances in common use for extinguishing fires when they originate. The tests appear to have been thorough, and they were also carried out with impartiality, so that the records furnish valuable data for determining which is the most suitable equipment to adopt in given circumstances.

The current number of the *Zeitschrift für physikalische Chemie* (January 5) contains a contribution by E. Cohen and H. R. Kruyt on the E.M.F. of the Weston cell. They are unable to confirm the abnormal results for 10 per cent. and 12·5 per cent. cadmium amalgams described by Janet and Jouaust, but are in agreement with Bijl's views. At 0°, cells made up similarly show variations amounting to 0·2 millivolt, and if an accuracy of this order is required in comparisons at low temperatures the cells must be immersed in a bath. Full details are given of the precautions taken to secure the purity of the materials used, and a diagram is given of a convenient form of cell.

The notification of the Metropolitan Gas Referees for the year 1909 is practically identical with that for 1908. In addition to a detailed account of the construction of the apparatus used, methods of testing are laid down for the detection of sulphuretted hydrogen, the determination of the amount of sulphur compounds (other than sulphuretted hydrogen), of the illuminating power with the London Argand, No. 2, and with the flat flame, of the gross and net calorific values, and of the pressure. Of these, the only figures now subject to statutory requirements are the sulphuretted hydrogen, pressure, and illuminating power as measured by the No. 2 London Argand.

In a paper published in No. 4, vol. xxviii., of the *Astrophysical Journal*, Prof. Fowler and Mr. A. Eagle describe a method whereby from any prismatic spectrum a rectified copy, for comparison with a grating spectrum, may be obtained; the importance of such a method will readily appeal to all spectroscopists. Dr. E. S. King has previously obtained such corrected copies, but, apparently, he secured the necessary adjustments of his copying apparatus by trial. In the method now published these adjustments may be calculated so that the apparatus may be set up straightway, and very accurately rectified spectra obtained. The writers state the formulæ they have developed for this purpose, and also give an example to illustrate the accuracy of the results obtained. In a section of the spectrum of the iron arc, extending from λ 4823 to λ 5127, the greatest error in the result amounted to only 0·1 of a tenth-metre; this corresponds to a displacement of about 1/300 of an inch, the range of the whole spectrum being more than 10 inches.

Messrs. Isenthal and Co.'s new list of rheostats contains illustrations and particulars of many forms and types of resistances for switchboards, bridges, and experimental work. A neat form of potentiometer rheostat is shown, which consists of a cylindrical block of serpentine having a helical groove cut on its outer surface, into which the wire is placed. A central spindle is firmly fixed to the block, and a screw-thread is cut on this spindle having the same pitch as the helical groove on the block. A tube fits over this spindle and carries the sliding spring which makes contact. An ebonite knob fixed at the top of the tube enables the sliding contact to be moved gradually along the whole length of the wire, and its position can be read off on a scale engraved on the spindle of the tube. Coarse adjustments can rapidly be made by pressing a button on the central rod, which releases the contact and enables it to be displaced in a vertical direction. When the button is released the contact always automatically replaces itself on the wire, and cannot fall between the turns. Some good regulating resistances with sliding contacts are also shown. These are made up of slabs of hardened asbestos, which may be mounted up together to form magazines of ten or any number of slabs. The contact levers each work between two slabs, making contact on both simultaneously. The contact fingers are very carefully made, and ensure a more gradual regulation than is usually the case in this type of resistance. The potentiometer rheostat mentioned above is also adapted to a Wheatstone drum bridge, which is made with a fixed drum and an additional direct ohm scale. Plug contacts for the comparison resistances and the terminals are carried on the base, and the resistances of 0·1, 1, 10, 100, 1000 ohms are enclosed in a ventilated box on which the whole is mounted. Several types of electric furnaces are also described.

The first article in the February number of *Travel and Exploration*, published by Messrs. Witherby and Co., is on Dr. Sven Hedin's explorations, by Sir Thomas Holdich. Among other articles in this attractive magazine is one by Dr. C. G. Seligmann, on the Veddas of Ceylon. The interesting text and brilliant illustrations should make the magazine appeal to a wide circle of readers.

Science Progress for January well maintains its usual high standard of interest. The articles on the destruction of wood by fungi, by Dr. A. H. Reginald Buller; the south-eastern coalfield, its discovery and development, by Mr. Malcolm Burr; and the Palæolithic races and their modern representatives, by Prof. W. J. Sollas, will appeal to a wider circle than the remaining more technical articles. A characteristic paper by Prof. H. E. Armstrong, entitled "A Dream of Fair Hydrone: a Chemical Idyll," will be read with interest by chemists.

We have received a copy of the thirty-sixth annual issue, that for 1909, of "Willing's Press Guide." It contains a comprehensive index of all newspapers, magazines, reviews, transactions of learned societies, in fact, of every form of periodical literature published in the United Kingdom.

The guide also provides a list of the principal colonial and foreign journals and a variety of general information. This useful work of reference is published at 125 Strand, London, and its price is 1*s.*

The current number of the *London Quarterly Review,* which is published by Mr. Robert Culley, is rich in thoughtful articles on subjects receiving great attention just now from intellectual readers. We note, in particular, articles by Mr. J. Butler Burke on materialism and life, and by Mr. Henry Gulliford, of South India, on "Todas and Tibetans: a Study in the Evolution of Religion." In addition to articles, the magazine provides notes and discussions on literary and theological topics, and an unusually large number of reviews of recent books.

Two large coloured maps, showing respectively the political boundaries and economic products of Brazil, have been issued by the director of the Mission Brésilienne, 28 Boulevard des Italiens, Paris. Upon the back of each sheet is printed a large amount of useful information relating to the general political and economic geography of the country.

The Carnegie Institution of Washington has published the seventh of a series of volumes which will form eventually a complete index of economic material in documents of the States of the United States. The present volume deals with California from 1849–1904, and has been prepared for the department of economics and sociology of the Carnegie Institution by Adelaide R. Hasse, of the librarian department of public documents, New York Public Library. The scope and character of this exhaustive index have been explained in these columns in referring to previous volumes.

Messrs. Cassell and Co., Ltd., have published a booklet, written by Mr. H. H. Thomas, on "Sweet Peas and how to Grow Them." The text contains just that practical information the amateur gardener requires, and includes numerous illustrations from photographs and sketches.

OUR ASTRONOMICAL COLUMN.

Recent Brilliant Fireballs.—Mr. W. F. Denning writes:—A brilliant Quadrantid passed horizontally, with a slow motion and long course, along the W. heavens on January 6, 8h. 40m. Other fine meteors were noticed on January 7, 9h. 27m.; on January 11, 5h. 30m., 7h. 40m., 8h. 11m.; January 13, 9h. 48m.; January 17, 8h. 20m.; January 19, 5h. 50m., 7h. 50m., &c. But the most striking object of all was that of January 11, 8h. 11m., and a large number of descriptions of the appearance and position of this brilliant visitor have come to hand. From these I have worked out the real path as follows:—Height, 58 to 29 miles over Llandovery to Usk, South Wales; length of path, 52 miles; velocity per second, 13 miles; radiant point, 332°+36°; earth point, Chippenham, Wilts. The meteor was estimated by Mr. H. Chapman, of Newtown, N. Wales, as brighter than the full moon, and it gave two flashes of sufficient intensity to light up the firmament and terrestrial objects for several seconds. The meteor moved slowly from a radiant in the western sky. Several of the observers describe the motion as undulatory, as though the object experienced some difficulty in penetrating our dense atmosphere. The radiant point is not conformable with that of any known meteoric shower, but it falls in the same place as that of an active stream or streams visible in the months of July, August, and September.

Martian Features.—In No. 34 of the Lowell Observatory Bulletins Prof. Lowell describes, and gives the positions of, certain white spots which have been observed in the arctic and subarctic zones of Mars, time after time, by the Flagstaff observers. Eight of these spots have been recorded, and they do not appear to be restricted to any zone, although, individually, they always appear year after year in the same place. The chief of them appears in long. 206°, lat. 83° N., and was first observed by Schiaparelli in 1884; in 1903, at Flagstaff, this spot was kept under observation from June 21 to August 10 (Martian dates), being seen at every one of the six presentations.

To account for the appearance of these white spots a natural supposition would be that they are snow-fields or glaciers on high mountain tops; but observations show that there are no considerable mountains on Mars, therefore the question as to the nature of these phenomena remains to be solved by future discussion.

In a paper communicated to the Royal Astronomical Society (Monthly Notices, vol. lxix., No. 2, December, 1908) M. Antoniadi discusses a composite drawing which he made from a print showing forty images of Mars, taken at the Lowell Observatory. The analysis of the photographs and the comparison of the results with those previously obtained from visual observations lead to some important conclusions respecting the objective existence of certain features about which various visual observers have hitherto disagreed. In general, the photographs confirm the existence of many features reported by Schiaparelli, Lowell, and others, and, what is perhaps more important in the discussion of the results obtained by different observers at different epochs, they afford strong evidence of change in several important features of the planet's disc, *e.g.* the Syrtis Major is shown to be of a slightly different shape on these photographs, taken 1907, July 11, from that observed visually by Schiaparelli between 1877 and 1888.

Atmospheric Polarisation.—In an extract from the *Astronomische Nachrichten* (No. 4283) Herr Chr. Jensen discusses the question of atmospheric polarisation, and shows that there are two neutral points where there is no polarisation. These two points are shown to vary with the solar activity and the amount of volcanic dust and other impurities in the atmosphere, and the author suggests that more observations should be made by meteorologists and astronomers in order to elucidate the question of relationships suggested by the results of his discussion.

Making a Forty-centimetre (15·7 Inches) Cassegrain Reflector.—In a brief note which appears in No. 4295 of the *Astronomische Nachrichten* M. Schaer describes the method of making a 40-cm. Cassegrain reflector, which he has made and has found very efficient at the Geneva Observatory.

The large disc is 7 cm. in thickness, and is pierced by a central hole 8 cm. in diameter; the method of mounting is the older one employed by Herschel, and is found to give sufficient resistance to the flexure of the mirror.

A great disadvantage in a Cassegrain telescope, as compared with a refractor, is the amount of stray light which enters the ocular and reduces the contrast of the image. This may be eliminated by suitable diaphragms, but it is a difficult matter to fix the latter in exactly the correct position. M. Schaer has surmounted this difficulty by mounting a conical tube inside the telescope, so that the stray light is intercepted before it reaches the eye-piece. This conical tube is made of thin sheet iron, and is 150 mm. long; the diameter of the open end is 60 mm., that of the eye end 75 mm., and as the focal plane is limited to 70 mm. diameter, this additional tube in no way interferes with the image.

Tests made with this instrument indicate that in intensity of the focal image it is superior to a crown-flint refractor of equal aperture, whilst its superiority for photography is obvious in many directions.

The Poles of Double-star Orbits.—In No. 4291 of the *Astronomische Nachrichten* Prof. Doberck discusses the relation of the poles of double-star orbits to the ecliptic and to the galaxy. The results show that the poles do not lie along the galaxy nor near the pole of the ecliptic, but it appears to be more probable that they lie along the ecliptic than that they lie near the galactic pole.

Remarkably Dark Penumbral Eclipse of the Moon.—Visual observations and photographs made at the Juvisy Observatory show that the penumbral eclipse of the moon, which took place on December 7, 1908, was an exceptionally dark one. By giving short exposures on slow plates